What is claimed is:

1. A separator for use in a linear guide having a guide rail, a slider disposed on the guide rail so as to move relatively each other, and a plurality of roller-shaped rolling elements incorporated in the slider, the separator comprising:

a separator main body having, on both sides in a front and rear direction thereof, recessed surface sections which contact circumferential sections of the rolling elements; and

at least a pair of arm sections provided parallel to each other on both sides of the separator main body while being oriented in the same direction,

wherein a length of the arm section is equal or shorter than a distance between centers of two adjacent rolling elements with the separator main body sandwiched therebetween, with respect to a lateral direction of the separator main body.

2. A separator for a linear guide according to claim 1, wherein the arm sections have a height which is about 20% to 60% with respect to the diameter of the roller-shaped rolling element.

3. A separator for a linear guide according to claim 1, wherein a lateral length of the separator main body is made slightly shorter than an axial length of the roller-shaped

rolling element, and wherein one of right and left side surface sections of the rolling element contacts with a surface which is formed on an inner side surface of the slider so as to be adjacent to a raceway of the slider and is finished concurrently with finishing of the raceway.

4. A separator for use in a linear guide having a guide rail, a slider disposed on the guide rail so as to move relatively each other, and a plurality of roller-shaped rolling elements incorporated in the slider, the separator comprising:

a separator main body having, on both sides in a front and rear direction thereof, recessed surface sections which contact circumferential sections of the rolling elements; and

a clearance groove formed in the center of the recessed surface section in a circumferential direction of the rolling element.

5. A separator for use in a linear guide according to claim 1, wherein a through hole is formed in the center of the recessed surface sections so as to penetrate through the recessed surface sections in the front and rear direction of the separator main body.

6. A separator for use in a linear guide according to claim 4, wherein a through hole is formed in the center of the

recessed surface sections so as to penetrate through the recessed surface sections in the front and rear direction of the separator main body.

7. A separator for a linear guide according to claim 1, further comprising bridge sections for connecting the separator main bodies with the arm sections.

8. A separator for a linear guide according to claim 7, wherein, in relation to the height of the recessed surface from an imaginary line interconnecting rotational centers of the adjacent rolling elements to an end face substantially parallel to a direct-acting surface of the rolling element in the recessed surface section of the separator main body, in a change direction section where the direction of movement of the rolling element is changed around a predetermined motion center, a height Ho of the recessed surface from the imaginary line interconnecting the rotational centers of the adjacent rolling elements on a distal side with reference to the motion center is made greater than a height Hi of the recessed surface from the imaginary line interconnecting rotational centers of the adjacent rolling elements on a proximal side with reference to the motion center.

9. A separator for a linear guide according to claim

7, wherein, in relation to a width of the separator main body at an end face substantially parallel to a direct-acting surface of the rolling element in a change direction section where the direction of movement of the rolling element is changed around a predetermined motion center, a width "a" of the separator main body located on a distal side with reference to the motion center is greater than a width "b" located on a proximal side with reference to the motion center.

10. A separator for linear guide according to claim 7, wherein, when the arm sections are configured so as to extend to substantially identical lengths from the center on both sides of the separator main body toward rotational centers of adjacent rolling elements in a moving direction, when a length of the arm section located on one side is taken as L;

a diameter of the rolling element is taken as Dwe;

a distance between centers of adjacent rolling elements is taken as κDwe;

a radius from the motion center to a locus of movement of rotational centers of the rolling elements at the change direction section is taken as R; and

a radius from the motion center to an envelope surface, which is located at a position closer to the motion center than to an imaginary line interconnecting the centers of the adjacent rolling elements and defined by the arm sections (a height of

the arm section in a direction orthogonal to a raceway surface of the rolling element is taken as A), is taken as Ri,

the arm sections are formed into a contour such that a length Li of the arm section on one side (i.e., the length of one inner arm section), the arm section being located at a position closer to the motion center than to the imaginary line interconnecting the centers of the adjacent rolling elements and a length Lo of the arm section on the other side (the length of an outer arm section), the arm section being located at an opposite side to the motion center with reference to the imaginary line interconnecting the centers of the adjacent rolling elements satisfies the following equations:

$$\theta = \sin^{-1}\{\kappa Dwe/(2R)\}$$

$$0.3/2 \times Dwe \leq A \leq (R - Ri)$$

$$Li < (\kappa Dwe/2 - A\sin\theta)$$

$$Lo < \kappa Dwe/2.$$

11. A separator for linear guide according to claim 7, wherein, when the arm sections are configured to extend, on the respective sides of the separator, from the center of the separator main body toward the rotational centers of the adjacent rolling elements to different lengths with respect to the moving direction, the maximum length Ls of a total sum of lengths of the arm sections extending on the respective sides of the separator with respect to the moving direction is smaller than

the distance κDwe between the rotational centers of adjacent rolling elements.

12. A separator for linear guide according to claim 7, wherein the contact surfaces provided on both sides of the separator main body with respect to the moving direction come into contact with adjacent rolling elements at a position, where a dimension between recessed contact surfaces of the recessed surface section is minimized.

13. A separator for linear guide according to claim 7, wherein

a recessed lubricant reservoir is formed in the contact surfaces of the recessed surface section.

14. A separator for use in a linear guide according to claim 1, wherein the guide rail has a roller guide surface,

the slider has a load roller guide surface, a pair of change direction paths and a roller return passage,

the load roller guide surface opposing the roller guide surface constitutes a roller track along with the roller guide surface, the pair of change direction paths remaining in communication with both ends of the roller track, and the roller return passage remaining in communication with the pair of change direction paths; and

an endless circulation path is constituted of the roller track, the pair of change direction paths, and the roller return passage,

the linear guide has guide grooves in the endless circulation path, the grooves continuous in a direction in which the rolling elements are arranged,

the pair of arm sections are guided by the guide groove; and

lubricant reservoir sections which are opened in respective the recessed surface section, the openings of the lubricant reservoir sections being made smaller than an outer dimension of the arm section, thereby preventing fitting of the arm section into the lubricant reservoir section.

15. A separator for use in a linear guide according to claim 14, wherein the maximum dimension of the opening section is smaller than the maximum dimension of the arm section within a cross section orthogonal to a longitudinal direction of the arm section.

16. A linear motion apparatus comprising:

a guide rail including a rolling surface;

a slider including a rolling surface opposing to the rolling surface of the guide rail and guided by the guide rail by way of a plurality of rolling elements interposed between

the rolling surfaces so as to move relatively each other; and

a separator interposed between the adjacent rolling elements and including recessed surface sections being formed in portions of each of said spacers opposing said rolling elements,

wherein a contact position between the recessed surface section of the separator and the rolling element is set within a range of contact angle of 19° to 35°.

17. A linear motion apparatus comprising:

a guide rail including a rolling surface;

a slider including a rolling surface opposing to the rolling surface of the guide rail and guided by the guide rail by way of a plurality of rolling elements interposed between the rolling surfaces so as to move relatively each other; and

a separator interposed between the adjacent rolling elements and including recessed surface sections being formed in portions of each of said spacers opposing said rolling elements,

wherein a cross section of the recessed surface section is formed into the shape of a Gothic arch; the diameter of the rolling element is taken as Dw; a contact angle between the separator and the rolling element is taken as θ; the radius of a Gothic arch groove of the recessed surface section is taken as R; the bottom thickness of the groove of the recessed surface

of the separator is taken as 2δ; and the curvature radius of the recessed surface section is taken as "f", the separator assumes the contact angle θ which satisfies the following equations (1) to (3)

$$0.5Dw \cdot \sin\theta\tan\theta = \delta + R(\cos\theta_0 - \cos\theta) \quad \ldots (1)$$

$$\theta_0 = \sin^{-1}[\{(2f-1)/(2f)\}\sin\theta] \quad \ldots (2)$$

$$f = R/Dw \quad \ldots (3).$$

18. A linear motion apparatus comprising:

a guide rail including a rolling surface;

a slider including a rolling surface opposing to the rolling surface of the guide rail and guided by the guide rail by way of a plurality of rolling elements interposed between the rolling surfaces so as to move relatively each other; and

a separator interposed between the adjacent rolling elements and including recessed surface sections being formed in portions of each of said spacers opposing said rolling elements,

wherein a cross section of the recessed surface section is formed into the shape of a single circular arc; the diameter of the rolling element is taken as Dw; a contact angle between the separator and the rolling element is taken as θ; the radius of a circular arc groove of the recessed surface section is taken as R; the bottom thickness of the groove of the recessed surface of the separator is taken as 2δ; and the curvature radius

of the recessed surface section is taken as "f", the separator assumes the contact angle θ which satisfies the following equations (4) and (5)

$$0.5Dw \cdot \sin\theta\tan\theta = \delta + R(1 - \cos\theta) \quad \ldots (4)$$

$$f = R/Dw \quad \ldots (5).$$

19. A linear motion apparatus according to claim 18, wherein the range of the contact position between the recessed surface section of the separator and the rolling element is set within a range of ±10°.

20. A linear guide comprising the separator defined in claim 1.

21. A linear guide comprising the separator defined in claim 4.